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ABSTRACT

School administrators and teachers are increasingly relying on sophisticated technology systems to provide support and service in completing their daily tasks in schools. A myriad of tasks associated with operating a school has been affected dramatically over the past few years as computer and telecommunications technologies have been integrated into the school's instructional and administrative functions. The needs of professional educators are substantial for just-in-time staff development on managing and using telecommunications-based technology. This paper presents a technology integration model that has been used to successfully integrate technology in the Jones Intermediate School (Texas). The school serves 490 fifth and sixth grade youngsters. The model is based on selected performance domains--staff development, implementation, and organizational oversight--of the principalship. Key elements of the Technology Integration Model include: employing a site technology coordinator, establishing a technology cadre, establishing a technology core decision group, and the benchmarking process. Taken together, the model components have supported technology integration at this school across several years. In order for this school's success with technology integration to occur elsewhere, committed faculty and a committed principal are essential. (Author/SWC)

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Integrating Technology in the School Environment:

Through the Principal's Lens

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Integrating Technology in the School Environment:
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Abstract

School administrators and teachers are increasingly relying on sophisticated technology systems to provide support and service in completing their daily tasks in schools. A myriad of tasks associated with operating a school has been affected dramatically over the past few years as computer and telecommunications technologies have been integrated into the school's instructional and administrative functions. The needs of professional educators are substantial for just-in-time staff development on managing and using telecommunications based technology. The purpose of this paper is to present a technology integration model that has been used to successfully integrate technology in a school.

Integrating Technology in the School Environment:
Through the Principal's Lens

School administrators and teachers are increasingly relying on sophisticated technology systems to provide support and service in completing their daily tasks in schools. A myriad of tasks associated with operating a school has been affected dramatically over the past few years as computer and telecommunications technologies have been integrated into the school's instructional and administrative functions. The needs of professional educators are substantial for just-in-time staff development on managing and using telecommunications based technology. For schools in Texas, the Long-Range Plan for Technology 1996-2010 (Texas Education Agency, 1996a) provides the following recommendations for technology-management and preservice programs for educators.

Between 1997 and 2010, schools should:

- Integrate planning for technology into all classroom, campus, and district planning;
- Integrate technology into instructional management and administration;
- Increase students' technology proficiencies;
- Increase educators' effectiveness in using technology;
- Increase academic performance across the curriculum through technology;
- Ensure accessibility by all students to technology-based instruction ...;
- Use student performance data and curriculum materials that are provided and managed electronically in instructional planning [pages 23 and 36].

Given these recommendations from the State Board of Education, and the national agenda for integrating technology in schools (USOE, 1996), the timing is critical for integrating technology into the operation of schools. The purpose of this paper is to present a technology integration model that has been used to successfully integrate technology in a school. This model is based on selected performance domains (staff development,

implementation, and organizational oversight) of the principalship (Thomson, 1993).

Theoretical Perspectives

Staff Development: School administrators realize the importance of effective staff development programs in enhancing the professional knowledge and skills of personnel to improve classroom instruction. Although district level commitment to staff development is considered to be important, it is generally accepted that staff development must occur at the individual school in order for it to succeed in positively influencing instruction. The reasons for this assertion are due to the unique needs of a school's staff, the culture of each school, and the necessity of school-level support to incorporate new knowledge and skills into classroom practices. To effectively develop a staff development program for the school, the principal is responsible for:

- establishing planning committees that develop program objectives, related activities and assign responsibilities to colleagues;
- discussing with those assigned responsibilities the resources, facilities and scheduling aspects of the program;
- recruiting faculty and staff to participate, and providing administrative support to facilitate their participation;
- reviewing plans and arrangements of planning committees (Thomson, 1993, pages 11-12).

Implementation: Implementation is another key domain for the principalship in the integration of technology into the operation of the school. Staff development programs often fail because too little attention is given to implementing the program once it is designed and scheduled. Problems occur when actual support and follow through are inadequate, when the unit of operation is the school district rather than the school, and when the time provided for acquiring new skills is not sufficient. These errors can be avoided by heeding the literature that shows effectiveness of staff development programs increases when principals maintain a high profile during training; when the principal involves the faculty in program planning and evaluating post-training performance; and when the

principal encourages and arranges for school faculty to serve as trainers and leaders (Thomson, 1993).

A research effort conducted by the Texas Center for Educational Technology (TEA, 1996b) on factors affecting the integration of technology into classrooms reported the following lessons learned from this effort:

- Collaborative planning is required;
- The combination of money, knowledgeable people, and a thoughtful plan are requisites for success;
- Comfort with technology is essential;
- Continual support of the technology is imperative;
- Both planning and pacing of the implementation are important;
- Commitment by teachers to use the technology is important;
- Rethinking personnel units is necessary;
- Timely professional development is essential.

Although these "lessons" were gleaned from surveying schools at all grade levels across Texas regarding technology integration, consistent themes and concepts appear in this list and the recommendations for conducting successful staff development programs [i.e., collaboration, careful monitoring of the rate of implementation and assessment of effects]. The importance cannot be overstated, of the dynamic relation among allocated resources, the personnel involved in the process and the plan itself. Assuming that the staff development program is successful, there will likely be an impact on the personnel assignments in the school. In the case of technology integration, the potential need for a software and hardware trouble-shooting resource in the school's classrooms and offices will necessitate adjustments in personnel budgets and assignments for that school (TEA, 1996b).

Organizational Oversight: Organizational oversight also is an important function of principals who deal effectively with staff development programs. This function is exhibited by principals who plan for the future through participatory strategic planning processes. First, they participate in developing the goals in the strategic plan. Second, decisions about the resources to be allocated and the complexity and timing of scheduled

activities are developed in the context of what will be necessary to accomplish the strategic plan goals. Third, procedures are established to monitor the quality of implemented activities and make adjustments in low yielding or unproductive activities. Fourth, program evaluation is based on whether the planned sequence of activities and allocated resources resulted in the strategic goals being achieved (Erlandson, Stark & Ward, 1996). In other words, effective principals are continually engaged in staff development, from conceptualization through summative evaluation of the effort.

Context for the Model

These principles for integrating technology into the total operation of a school is illustrated through the following particularly successful case.

Jones Intermediate School serves approximately 490 fifth and sixth grade youngsters in a rural school district near Houston, Texas. The school's student ethnicity distribution is 17% African-American, 19% Mexican-American, 63% Euro-American and 1% Other. Forty percent of the students are from economically disadvantaged households and 5 percent are considered to be Limited English Proficient. The average daily attendance at Jones is 95%.

The school, closed for many years, was reopened in 1992 after it was equipped with a local area network and a multimedia station (computer equipped with presentation software, LCD projector, and printer) in each classroom. Funding for this technology infrastructure was provided by the school district. Concurrently, the school was selected to participate in the Texas Education Collaborative (TEC), a funded project to establish a professional development school enriched with technology equipment and supporting funds for technology-based staff development. The TEC funding was targeted at establishing a technologically equipped school where teaching candidates would experience the teacher's role in implementing technology-integrated curricula. A compressed video system enabling synchronous two-way audio and video communication was placed in the library in 1993 as part of the TEC program. The accompanying connectivity for the compressed video system enabled the

school to have direct connectivity to the Internet within a short time after installation of the compressed video system. Faced with the responsibility of facilitating the capable use of these technological tools was both an opportunity and a challenge. Enabling faculty to model successful use of these technology marvels was imperative, given the school district's investment and the external funding provided to the school.

Technology Integration Model

The Jones Intermediate School faculty and principal began developing and implementing a training approach to integrate technology applications across school functions that evolved into a model. Key elements of the Technology Integration Model include: employing a site technology coordinator, establishing a technology cadre, establishing a technology core decision group, and the benchmarking process.

Site Technology Coordinator: A half-time technology support person was initially provided to the school by the TEC. The role of the site coordinator was originally designed to be the person "on-call" to respond to technology hardware and software questions and problems that teachers and staff encountered as networked computer technology was introduced at the school. This role was soon realized to be so critical to the integration process that district support was provided to continue this position when external funding was no longer available. This individual's role has been expanded to developing and implementing training materials and being a "first call" resource to technology cadre members. The role is currently classified as a teacher/technologist and has been expanded to a full time position by the school district.

Technology Cadre: Taking a cue from the Carnegie Report, *Turning Points* (1989) teachers and staff organized into 6 academic teams (that is, 5th Explorers, 5th Innovators, 6th Discovers, 6th Pathfinders, Special Areas, Encore). All faculty and staff members also serve on a cadre. There are 5 cadres (Technology, Service-Learning, Special Populations, Discipline, Accountability/Assessment). The technology cadre's membership includes

teachers and paraprofessionals from each academic team. This cadre is led by the site technology coordinator.

Each cadre member receives extensive training on operating hardware and using software applications (such as, operating the resident compressed video system for class applications, using the Internet for curriculum development and instruction, developing multimedia applications for classroom use). Cadre members are also trained to provide troubleshooting support to their academic team on tasks (such as, reformatting hard drives, installing batteries and installing new software on classroom computers). Training is provided by the technology site coordinator or technology consultants hired by the school district. Given these skills, technology cadre members are responsible for providing leadership in maintaining an information log on each computer (for example, listing resident software, listing the components and capacity, and recording the maintenance completed) and assisting academic team members in keeping current their individual technology folders (for example, resource for web site addresses, access codes and protocols for using software).

Technology Core Decision Group: This steering group consists of the site technology coordinator, librarian, library technology assistant, and the principal. Among its tasks are: developing and implementing the school's strategic technology plan (that includes: goals, strategies and budget) and providing systematic faculty development on technology. To illustrate, "Technology Mondays" are scheduled once each month for teachers to learn new applications and preview new software. These hour long sessions take place during a time set aside for staff development or faculty meetings on Monday, immediately after school. This group serves as the school's policy making body on technology and it represents an organized and visible group for faculty to access regarding technology needs and issues.

Benchmarking Process: Establishing technology targets was instituted by the principal when the school was reopened in 1992. However, within two years the Technology Core Decision Group became responsible for establishing benchmarks that the faculty strives to attain during the

ensuing year. This process has enabled the school as a unit to raise the documented level of technology use and competency of students and staff. Establishing expectations that are easy to understand and remember are important characteristics of this process. A critical issue here is to establish challenging but reachable goals for the school during the year. To accomplish this task, technology integration has been treated as any other curricular innovation expected to be adopted by the faculty (Clark, 1994). The following table presents the benchmarks established to illustrate the progression of technology integration in this school.

Place Table 1 about here

The benchmarks presented in table 1 convey the dynamic nature of this process. Both instructional and organizational benchmarks have occurred with some being repeated across years. It is evident these benchmarks do reveal much about the level of technology integration at the school and what is valued by the faculty.

Evidence of Success

While formative and informal assessments have constantly occurred on the progress of implementing technology, the opportunity to examine the process in a more formal sense was available, given the TEC funding that supported this effort. Serving as a project evaluation specialist on the funded project, Manus (1997) compiled extensive data on the hours of technology staff development completed by teachers occurring across three years. She also made classroom observations of these teachers and their students to determine the level of classroom technology applications, and compiled state accountability test results of students across time. Manus found a statistically significant correlation ($r=.70$) between the measures of staff development hours and technology applications in classrooms. That is, teachers who experienced greater amounts of staff development training in technology were observed to use technology more with their students than teachers who participated in less training. Further, she reported that 3 of 4 comparisons of student passing rates on state accountability tests (1995-1994 comparisons) yielded positive

change scores and a correlation ($r=.08$, n.s.) between staff development hours of the teachers and accountability test change scores of their students. Although student achievement was not markedly affected by technology training of their teachers, the trend of increasing numbers of students passing the accountability tests was encouraging and it has continued on subsequent annual comparisons.

Conclusions

The technology integration model presented here evolved over several semesters with the actual processes and components often being applied before they were described and codified. The Site Technology Coordinator was introduced to the school as part of an external grant to provide a local resource for handling technical questions about hardware and software. This idea of providing a local resource is consistent with the notion that continual support of the technology is necessary for faculty to adopt the technology (TEA, 1996b). Also, by changing the roles and responsibilities of a classroom teacher who was interested in technology to become the school's first technology coordinator, the principal applied a recommended implementation staff development practice of arranging for a school faculty member to serve as a trainer and leader in the technology integration process (Thomson, 1993). As the technology integration process continued and the external funding cycle was completed, the decision to make the technology coordinator a permanent role funded by district resources represents another idea cited by the Texas Center for Educational Technology (TEA, 1996b) about rethinking personnel units for successfully integrating technology into classrooms.

The Technology Cadre and Technology Core Decision Group both began during the third year of technology integration in the school and increased the number of faculty serving as trainers and leaders in the technology integration process. These groups also illustrate the role of collaborative planning of faculty in sustaining a school change effort such as, technology integration. With the establishment of these groups, formal mechanisms were available to support the principal with the staff development initiatives. To illustrate, these groups provided valuable advice to the

principal in planning and establishing objectives (benchmarks) and criteria for determining whether the objectives were being attained. The Technology Cadre was established to encourage faculty participation and it became a ready resource for technology integration challenges. The Core Decision Group provided a forum for the principal to participate and discuss the responsibilities, resources and timetable for accomplishing the benchmarks with the faculty. This group provided valued advice and perspectives to the principal in reviewing plans and arrangements of the faculty as their academic team planning efforts occurred. The successful functions performed by these groups are cited in the literature (Thomson, 1993; TEA, 1996b) as components needed for effective staff development programs.

Finally, the Benchmarking process began during the first year of the technology integration effort. This process illustrates how planning and pacing of the implementation serves technology integration (TEA, 1996b). By monitoring and recording attainment of the technology benchmarks, data were available to show what technology goals were important to the school's personnel, and the rate of adoption success the school exhibited across time. The benchmarking process has enabled the principal and faculty to plan future implementation activities based on end-of-year performance data on technology integration, a practice recommended in the literature on organizational oversight (Erlandson, Stark & Ward, 1996). This single process, if conducted carefully and maintained across time supports faculty ownership and involvement with technology integration.

Taken together, the model components have supported technology integration at this school across several years. Extant literature and successful practice have added credence to this model, but in order for this school's success with technology integration to occur elsewhere, committed faculty and a committed principal are essential.

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Benchmarks Table1

Table 1: Technology Integration Benchmarks

BENCHMARKS

Year One

Use of Electronic mail-Faculty expected to read their e-mail once each day
 Use of Macgradebook-Faculty expected to establish electronic grade files
 Distance Learning-a TENET account was established for each faculty member
 Classroom Instruction- faculty were expected to use multimedia weekly
 Faculty were expected to use computer software in class instruction

Year Two

Use of Electronic mail-Faculty expected to read their e-mail 3 times a day
 Use of Macgradebook-Faculty expected to export electronic grades to files server
 Distance Learning-use TENET and compressed video system
 MultiMedia Development-Each faculty expected to participate in the development of a multimedia presentation related to their class responsibilities
 Faculty expected to document use of computer software applications in lesson plans
 Faculty encouraged to participate in technology presentations at professional meetings

Year Three

Use of Electronic mail-Faculty expected to read their e-mail 3 times a day
 Use of Macgradebook-Faculty expected to export electronic grades to files server
 Technology Cadre Established-Cadre members expected to provide leadership in the use of technology to their academic team members
 Technology Core Decision Group Established-Group responsible for establishing annual technology benchmarks
 Distance Learning-use TENET and compressed video system: University classes offered and experiences with other schools established using compressed video
 Use of Averkey for classroom instruction
 Faculty expected to document use of computer software applications in lesson plans
 Faculty encouraged to participate in technology presentations at professional meetings

Year Four

Leadership of Technology Cadre increased-Technology Mondays established.
 Technology folders established, Computer Information Log established,
 Technology Core Decision Group developed Technology budget with input from Technology Cadre
 Continued use of electronic mail and Macgradebook
 Distance Learning-use TENET, compressed video system and the Internet
 Use of Averkey for classroom instruction
 Faculty encouraged to participate in technology presentations at professional meetings

Year Five

Integrate technology into the curriculum-Carnegie curriculum writing team interdisciplinary, technology integrated curriculum for all students; Discovery Gifted and Talented program developed; and Reading Renaissance program established
 Expand Distance Learning applications to include: Cultural Connections; Sturgeon Lake Indian Reserve School project; E-mail Mentor/Keypal program; CUSeeMe Desktop Conferencing
 Expand university collaborations
 Establish electronic lesson plans
 Conduct research using CD Roms and online resources
 Community Technology Open House established
 Implement community technology program
 Upgrade multimedia presentation stations for each academic team to include:
 Power Mac computer, CD Rom Library, color printer, color quick cam, Aver Key
 Encourage students to develop homepages
 Establish full-time technology coordinator position
 Continued use of electronic mail and gradebook software (gradebook software changed from Macgradebook to Excelsior)
 Continued leadership from the technology core team, technology cadre and technology coordinator
 Faculty encouraged to participate in technology presentations at professional meetings and publish their work